

# Relationship between Serum IgE and Intestinal Parasites

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## Abstract

Intestinal parasitosis has been a major public health problem in Iran. It is necessary to evaluate an up-date data in this regard to be used by local authorities. Serum IgE determinations and coproparasitological analyses were conducted on 1200 individuals in city of Ghaemshahr, Mazandaran province, northern Iran. A total of 1200 subjects were taken stool samples for three days consecutively. Two hundred and ninety seven cases (24.7%) were positive for parasitic diseases. The age group of 8-15 years old encompassed the highest rate of infection which showed a significant difference with the other groups ( $P < 0.01$ ). No significant difference was detected between males and females as to the rate of infection based on the Chi-squared test (14.2% vs. 10.6%), but a significant difference was seen between infection rate and cases education ( $P < 0.01$ ). An about 5-fold elevation in serum IgE level was demonstrated. Intervention programs including health education and environmental sanitation are recommended.

**Keywords:** Intestinal parasites, IgE, Helminths, Protozoa

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## Introduction

Infection with intestinal parasites is a major health problem in most of the countries (1). It is estimated that some 3.5 billion people are infected and that 450 million are ill as a result of these infections, the majority being children (2). These infections are regarded as a serious health problem, due to causing iron deficiency, anemia, growth retardation in children and other physical and mental health problems (2, 3). Previous studies in last decade, detected high prevalence rates of parasitic infection in most regions of Iran especially in high risk areas including, 44% (4), 47.2% (5), 73.6% (6) and 15% (7). The present study was conducted to determine the prevalence of intestinal parasitic infections and the rate of serum IgE in people of Ghaemshahr city, Mazandaran province, northern Iran.

## Materials and Methods

A total of 1200 subjects were taken stool samples for three days consecutively.

The samples were examined for the parasite eggs, cysts, and larvae using formol-ether concentration method described earlier (8). Amoeba trophozoites were examined in fresh smears.

The studied cases completed a short questionnaire that included their name, age and sex as well as level of their education.

To investigate the effects of parasitic infection on IgE concentration, serum total IgE concentration was measured in all subjects in whom parasitic infection was detected.

Total serum IgE concentrations were measured using the Pharmacia CAP System IgE FEIA (Pharmacia, Uppsala, Sweden) according to the manufacturer's instructions.

The obtained results for serum IgE level were interoperated as follows:  $< 20$  IU/ml indicating parasitic infection with low possibility; 20-100, with medium possibility and more than 100, with high likelihood.

**Statistical analysis** Chi-squared test was performed to associate between the prevalence

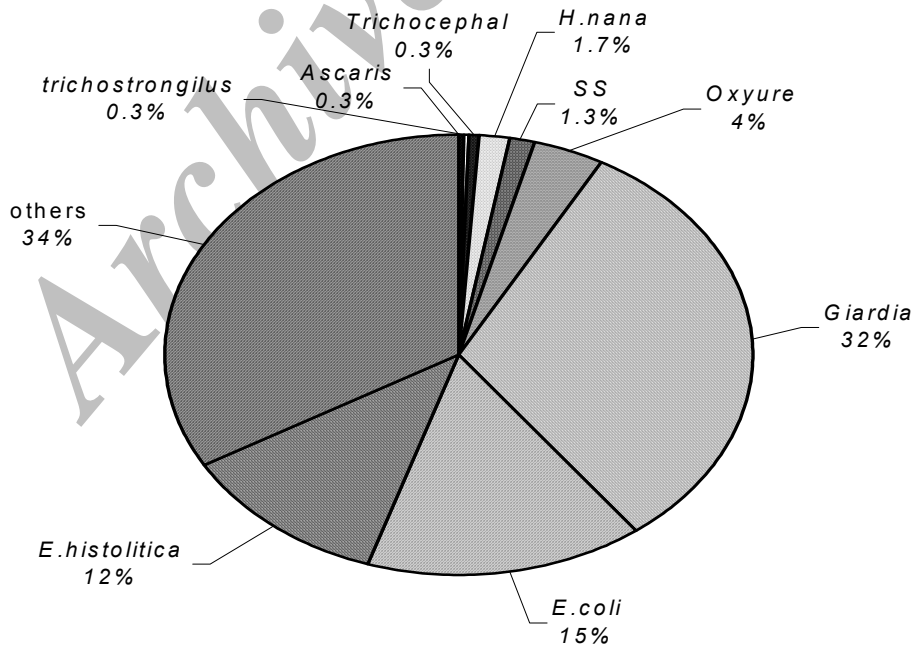
of intestinal parasitic infection and age, sex level education and serum IgE level.

**Results**

Sociodemographic characteristics and intestinal parasitic infection among the studied sample are shown in table 1. No significant difference was detected between males and females as to the rate of infection based on the Chi-squared test (14.2%vs.10.6%), but a significant difference was seen between infection rate and cases education ( $P<0.01$ ). The age group of 8-15 y encompassed the highest rate of infection which showed a significant difference with the other groups ( $P<0.01$ ). Types of intestinal parasites are summarized in Fig 1. Other Non-pathogenic parasitic infections not included in the fig 1, except *E.coli*, were as follows: *Iodamoeba butschlii*, *Entamoeba hartmanii*, *Dientamoeba fragilis* and *Endolimax nana*, wich were detected in 0.6%, 1%, 4.75% and 1.8% of cases respectively. Fig2 shows the rate of total serum IgE in infected cases.

**Table 1:** Sociodemographic characteristics and intestinal parasitic infection among the studied sample, Ghaemshahr, Mazandaran province, Iran, 2002

Factors	Total (No.)	Infected No.	%
All	1200	297	24.7
<b>Gender</b>			
Male	626	170	14.2
Female	574	127	10.6
<b>Age (in year)</b>			
0-7	90	54	4.9
8-15	406	99	8.2
16-23	176	28	2.3
24-31	137	33	2.7
32-39	185	46	3.8
40-47	120	19	1.5
>48	86	2	0.16
<b>Level of education</b>			
Illiterate	18	13	1
Elementary	562	167	13.9
Intermediate	84	15	1.2
Secondary	422	61	5.1
University	114	5	.4



**Fig. 1:** Types of intestinal parasites among infected persons in Ghaemshar, Mazandaran province, Iran.

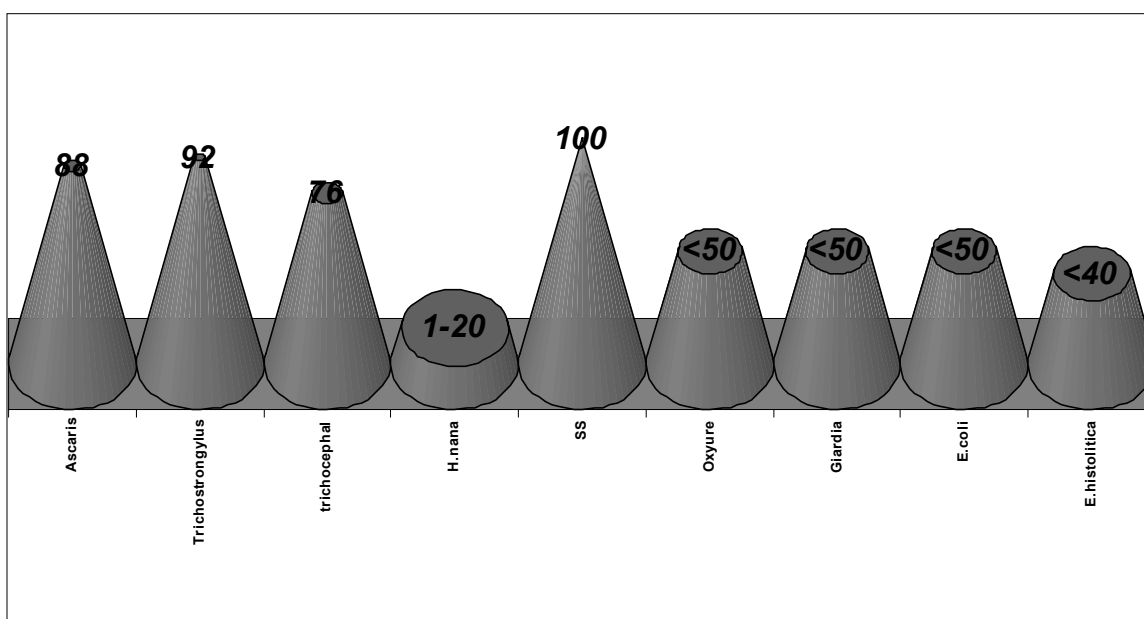


Fig. 2: Rate of total serum IgE in infected cases.

## Discussion

We recognized that 24 % of the population in Ghaemshahr city were infected by intestinal parasites, although some non-pathogen parasites were included in this rate as previously was mentioned. This finding is lower than those of mentioned earlier (4-7), by and large because of improvement in sanitary situation.

The age group of 8-15 years old was the most affected group in our samples, as is the case worldwide (9). Braga in Brazil reported that the seropositivity of intestinal parasites was 40% among 6-14 year old people (10). The high rate of infection among children may be attributed to defecation practices of young children and outdoor feeding in higher age groups (9).

*Giardia lamblia* and *E. histolytica* were the most common intestinal parasites among the study participants. Both can be transmitted orally by drinking water and both are environmental contaminants of the water supply (11). The previous studies showed the rate of *G. lamblia* infection as 16.2% (5), 22.29% (6) and 12.5% (7) in Kerman, Kangavar and

Sabzevar respectively. The rate of infection with *E. histolytica* in aforementioned surveys has been 3.7%, 2.5% and 0.4%, in that order. Studies conducted abroad, have determined the rate of infection with *G. lamblia* and *E. histolytica* as 37.7% and 5.88%, as well as 30.3% and 3.92%, respectively (9, 12).

Concerning helminths infection, the present study showed a low rate of infection. It should be stated that in recent years, there was a general decrease in the rate of related infection. This was mostly due to use of biochemical night soil for vegetation, improvement the sanitary measures and elevation the public understanding of health education. Nowadays, in our country the intestinal helminthic infestations are not of considerable important, while those having significance, are mostly *Fasciola hepatica* and hydatid cyst disease.

Parasitic infections can cause a 10 to 100 fold elevation in total serum IgE (12). These infections not only stimulate the production of specific anti-parasite IgE but also nonspecifically induce polyclonal IgE synthesis. In our

report, we observed the lowest and the highest rate of IgE in *H.nana* and *S.stercoralis* infected cases, respectively, i.e., about five-fold elevation. In a previous study a 20-fold elevation has been reported (12). Sustained high levels of monospecific IgE in serum can diminish specific IgE responses.

Intestinal parasites are an important public health problem in some areas in the country. Intervention programs including health education and environmental sanitation are recommended.

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